



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Q.1111

(03/93)

**INTERWORKING WITH SATELLITE
MOBILE SYSTEMS**

**INTERFACES BETWEEN THE INMARSAT
STANDARD B SYSTEM AND THE
INTERNATIONAL PUBLIC SWITCHED
TELEPHONE NETWORK/ISDN**

ITU-T Recommendation Q.1111

(Previously "CCITT Recommendation")

FOREWORD

The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the International Telecommunication Union. The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, established the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

ITU-T Recommendation Q.1111 was revised by the ITU-T Study Group XI (1988-1993) and was approved by the WTSC (Helsinki, March 1-12, 1993).

NOTES

1 As a consequence of a reform process within the International Telecommunication Union (ITU), the CCITT ceased to exist as of 28 February 1993. In its place, the ITU Telecommunication Standardization Sector (ITU-T) was created as of 1 March 1993. Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.

In order not to delay publication of this Recommendation, no change has been made in the text to references containing the acronyms "CCITT, CCIR or IFRB" or their associated entities such as Plenary Assembly, Secretariat, etc. Future editions of this Recommendation will contain the proper terminology related to the new ITU structure.

2 In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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Recommendation Q.1111**INTERFACES BETWEEN THE INMARSAT STANDARD B SYSTEM AND THE INTERNATIONAL PUBLIC SWITCHED TELEPHONE NETWORK/ISDN***(Melbourne, 1988; modified at Helsinki, 1993)***1 General**

1.1 This Recommendation includes information on the services offered in the ISDN relevant to the Standard-B INMARSAT system and describes the requirements for connection and internetworking with the public networks. Special terminology for this Recommendation is defined in Recommendation Q.1100.

Detailed interworking procedures are set out in Recommendation Q.1112.

NOTE – Recommendations Q.1101, Q.1102 and Q.1103 define the interworking procedures for the Standard-A INMARSAT system.

1.2 In addition to providing the capability to interwork using common channel signalling techniques between the terrestrial ISDN and the Standard-B INMARSAT system, due regard should be paid to the open systems interconnection reference model (X.200-Series Recommendations) and ISDN services and signalling methods (I-Series Recommendations) with a view to achieving uniformity in user procedures and formats, and to achieving generally applicable facilities.

1.3 Within the constraint of the need to operate as economically as possible, the preferred interworking cases are with the ISDN and with those parts of the international telephone network employing common channel signalling. If these cases do not exist at the ISC to which an MSSC is connected then another signalling system from the Q-Series Recommendations should be used.

1.4 The use of the ISDN for call connect purposes from the MSSC to the fixed user is expected to offer both improvements in quality and more flexibility in service.

2 Service capabilities

A general description of the INMARSAT Standard-B system is contained in Appendix I.

2.1 Channel capabilities

The system supports a range of channel capabilities as follows:

- single channel per carrier (SCPC) communication channels;
- time division multiplex/time division multiple access (TDM/TDMA) communication channels and random access (RA) channels with information bit rates of up to 16 kbit/s.

Further capabilities may be supported in the future, e.g. channels with information bit rates of up to 64 kbit/s. The services supported by each channel type are indicated in the following subclauses.

2.2 INMARSAT Standard-B bearer capabilities**2.2.1 SCPC channels**

The following bearer services on SCPC channels with an information transfer rate attribute of 16 kbit/s and 9.6 kbit/s and with the following information transfer attributes corresponding to those defined in Recommendation I.211 should be supported:

- a) Speech at 16 kbit/s and optionally at 9.6 kbit/s.
- b) Circuit mode 3.1 kHz audio services at 16 kbit/s (Transcoding to the circuit mode 64 kbit/s, 8 kHz structured bearer service, usable for 3.1 kHz audio information, of Recommendation I.211, should take place in the MSSC).

- c) Virtual call bearer service at an information bit rate of 16 kbit/s.
- d) Digital data, circuit mode service at an information bit rate up to 9.6 kbit/s for facsimile service.

2.2.2 TDM/TDMA channels

The following bearer services on TDM/TDMA channels should be supported with information transfer rates of 0.05, 0.3 for telex and low speed data respectively:

- a) Telex – Interworking with the ISDN should take place as defined in Recommendation U.202;
- b) Virtual call bearer service – Interworking with the ISDN should take place as defined for interworking between PSPDNs and the ISDN;
- c) Digital data, circuit mode – Interworking with the PSTN should take place as defined in the appropriate PSTN signalling system;

NOTE – Adaptors designed to CCITT Recommendations may not support call set-up for ship earth station terminating calls. This requires further study by INMARSAT.

- d) Digital data, asynchronous circuit mode symmetric – For further study by INMARSAT.
- e) Digital data, asynchronous circuit mode, asymmetric – For further study by INMARSAT.

2.2.3 RA channels

The following bearer services on random access channels may be supported:

- a) Connectionless data service – For further study by INMARSAT.

2.3 Teleservices

Teleservices should be supported as defined in Recommendation I.212. It is to be observed that not all teleservices of ISDN may be supported with bearer services that can be provided on SCPC or TDM/TDMA channels operating at net bit rates of 16 kbit/s or less.

3 Interworking scenarios

Three interworking scenarios can be envisaged for the interface between the MSSC and the fixed networks.

3.1 The first of these is shown in Figure 1. No interworking is envisaged between the MSSC and the ISDN, with the MSSC interfaced directly to the telex, public switched telephone and public data networks. In this scenario interworking with the PSTN supports speech and 3.1 kHz audio services.

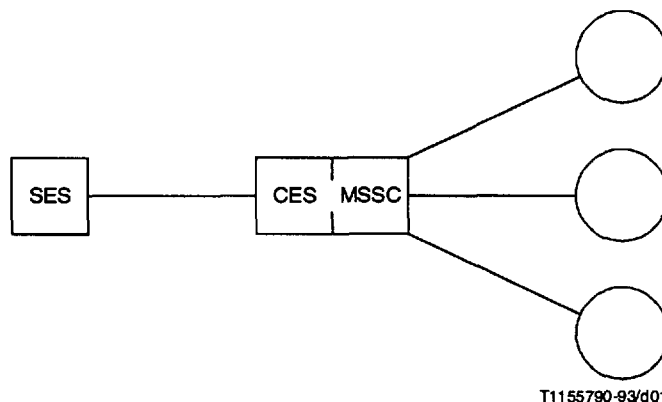


FIGURE 1/Q.1111

Interworking scenario with no ISDN interfaces

3.2 Figure 2 shows the situation where an ISDN exists and the MSSC has an interface to it. Interworking with the PSTN is achieved via the ISDN. Interworking with PDNs may be by direct interface with the PDN or via the ISDN, as in the cases of the PSTN. A direct interface will be required for interworking with the telex network.

In this scenario interworking with the ISDN supports speech, 3.1 kHz audio and data services as indicated in 2.2.1. Other data services as indicated in 2.2.2 and 2.2.3 may require interworking with PDNs.

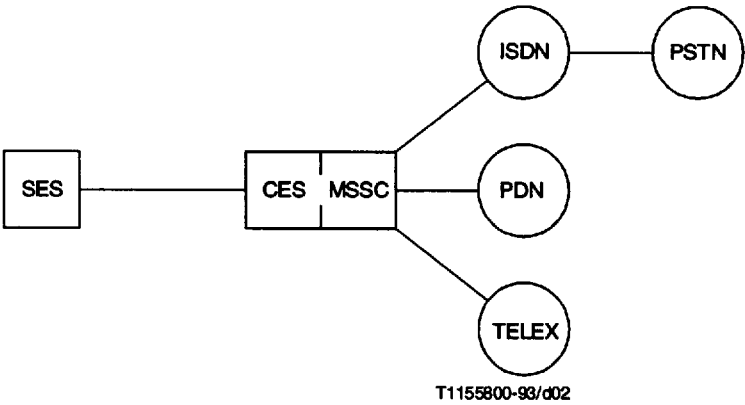


FIGURE 2/Q.1111
Interim interworking scenario with interfaces
to ISDN and other fixed networks

3.3 In the fully integrated interworking scenario the MSSC interfaces only to the ISDN. This is the preferred scenario and is illustrated in Figure 3. Interworking with the PSTN and the PDNs is achieved via the ISDN interface. However, interworking with the telex network may require a direct interface between the MSSC and the telex network.

In this scenario also, data services as indicated in 2.2.2 and 2.2.3 are converted to formats which correspond to bearer services in the ISDN. The MSSC may then contain adaptors with functions equivalent to those defined for the ISDN.

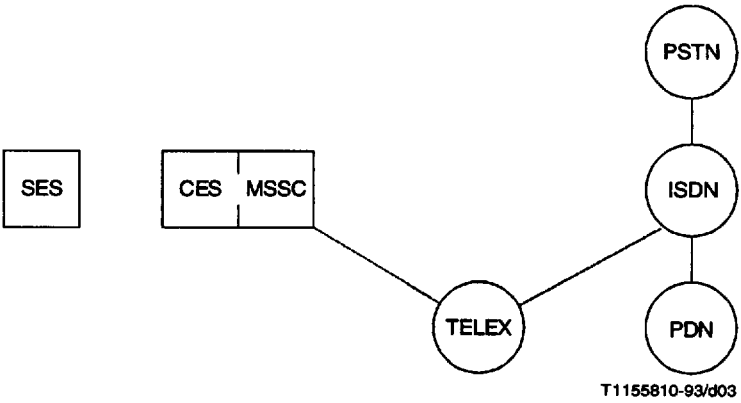


FIGURE 3/Q.1111
Interworking scenario with interface to ISDN only

4 Connection interface requirements

4.1 General

This subclause identifies the information that must be available at the interfaces between the ship earth station (SES) and the MSSC and between the MSSC and the fixed network, principally for the connection of services identified in 4.3.

4.2 MSSC-network interface

For ISDN connections ISUP should be used for message transfer. For non-ISDN or where ISUP is not available, TUP would be preferred.

If information transport between MSSCs over the fixed network is required, it is suggested that the procedures of the SCCP are used. Detailed interworking procedures are defined in Recommendation Q.1112.

4.3 SES-MSSC interface

Prior to and during call initiation the signalling channel functions may be provided by one or more common control channels.

A signalling capability should always be available during conversation in case it is needed for call clearing, call control, or for call management purposes. During a call the signalling channel may be multiplexed with the traffic channel at a lower bit rate so as to conserve radio channel capacity.

The multiplexed signalling channel on TDM/TDMA/RA channels may be used for bearer services such as connectionless data services, or connection oriented data services not requiring the establishment of a traffic channel.

The traffic channel should be used for bearer services such as:

- speech;
- circuit mode data services (including facsimile);
- packet mode data service;
- voice band data services.

4.4 Terminal to ship earth station interface

4.4.1 Non-ISDN interface

A configuration for non-ISDN terminals is shown in Figure 4. Digits may be entered either from telephone hand sets, or data terminals, which use Q.23 tone signalling formats. The signalling interface between the ship earth station and the terminals must also provide a means for detecting the hook-on/off condition. The line connection to the terminal from the ship earth station may use either analogue or digital techniques.

The ship earth station must convert both the signalling (digits and on/off-hook) information and the line connection format (analogue or digital) into the protocols used on the radio path.

4.4.2 ISDN interface

A typical example of the type of interface required could be as shown in Figure 5. In this case the ship earth station needs to provide a function equivalent to NT2 of the ISDN for termination of the ISDN basic access (see Recommendation I.420).

When CCITT No. 7 (ISUP) is used for interconnection at the MSSC, the coding of call failure causes used on the satellite channels will be in accordance with Recommendation Q.931.

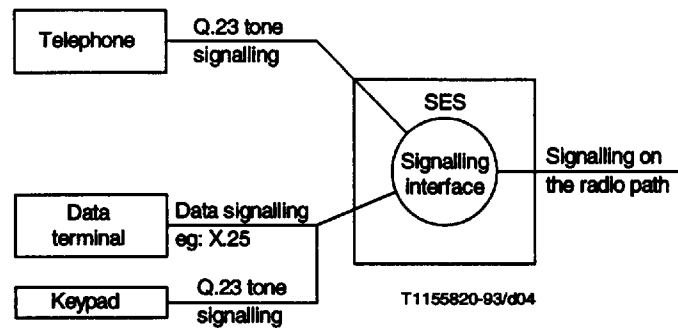


FIGURE 4/Q.1111
SES signalling interface for non-ISDN terminals

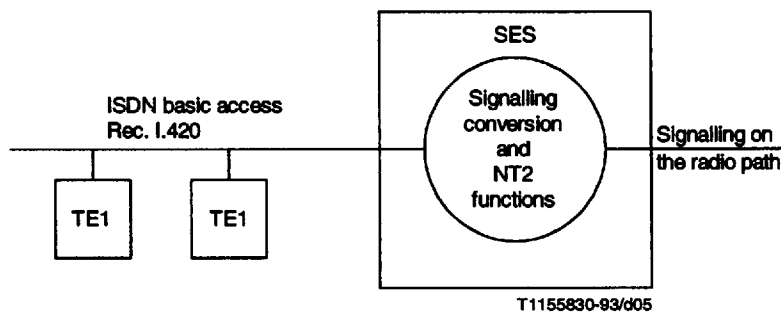


FIGURE 5/Q.1111
SES signalling interface for ISDN terminals

4.5 Calling procedures

4.5.1 Ship-to-shore call

a) Information elements on the radio path

The ship earth station should include the following information in the “access request” message:

- the CES address to which the request is being sent;
- connection request;
- bearer capabilities;
- special category indication such as priority, etc.;
- special user facilities.

This will be followed by the “service address” message, containing the called party address. In order to expedite the call set-up, all digits (and other information) will be entered into the ship earth station terminal prior to the request to the MSSC to set up the call.